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the bowsprit, which is six feet above the water. If the cable is hauled in at the rate of a foot a second, how fast is the vessel moving through the water when there is five fathoms of cable out? What is the acceleration of the vessel's velocity? [From *Byerly's Problems in Differential Calculus.*] Ans.—(a) 5/6 feet per second; (b)12/121 feet per second. Are these results correct?

⁂ Solutions of this problem should be sent to J. M. Colaw, not later than November 10.

MECHANICS.

73. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax Schools, Pittsburg, Pa.

A sixteen-foot plank weighs thirty-two pounds and is supported by two props, four feet and two feet from the ends. What weight is supported by each prop?

74. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

In the experiment of swinging in a vertical circle a glass containing water, and suspended by means of a string, if the string be two feet long, what must be the velocity at the lowest point if the experiment is to succeed? [From *Ziwet's Theoretical Mechanics*, Part III., p. 96.]

⁂ Solutions of these problems should be sent to B. F. Finkel, not later than November 10.

AVERAGE AND PROBABILITY.

69. Proposed by Rev. W. ALLEN WHITWORTH, M. A.

There are n equal sugar sticks. Each stick is broken into two pieces, all positions of the fracture being equally likely. Of the two n pieces thus formed, a child is to take the largest. Show that his expectation is $[2n+1]/[2(n+1)]$ of a stick. [From *The Educational Times*, June, 1898.]

70. Proposed by Professor MILLER.

A ship at A observes another at B, whose course is unknown. Supposing their speed the same, prove that the chance of their coming within a given distance, d, of each other is always $(2/\pi)\sin^{-1}(d/a)$, whatever the course taken by A; provided its inclination to AB is not greater than $\cos^{-1}(d/a)$, where $AB=a$.

[From *Cambridge Mathematical Tripos*, 1871.]

⁂ Solutions of these problems should be sent to B. F. Finkel, not later than November 10.